Comparison Of Siriraj Stroke Score with Ct-Scan Findings in Ischemic Stroke.

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KEYWORDS	ABSTRACT
Stroke, Ischemic Stroke, Siriraj Stroke Score, Sensitivity, Specificity, Diagnostic Tool, CT Scan, MRI, Early Intervention, Predictive Value	Stroke is one of the leading causes of death and disability worldwide, affecting one in six people during their lifetime. It occurs due to either a blockage in the brain's blood supply (ischemic stroke) or sudden brain hemorrhage (hemorrhagic stroke). Diagnosing stroke is crucial, and while CT scans are commonly used, they may not always be readily available, especially in resource- limited settings. The Siriraj Stroke Score (SSS), developed in 1991, offers a potential alternative for diagnosing strokes when CT scans are inaccessible or expensive. This study evaluates the effectiveness of the Siriraj Stroke Score in predicting ischemic and hemorrhagic strokes. The results demonstrate that the SSS is highly sensitive (92.5%) for ischemic stroke, making it a reliable tool for identifying patients with this condition. However, it has low specificity (0%) and cannot exclude ischemic strokes in patients without the condition. Despite its limitations, the study suggests that the SSS is valuable in screening for ischemic stroke and should be used in conjunction with other diagnostic tools, such as CT or MRI, for accurate diagnosis. Immediate action based on a positive Siriraj Stroke Score can help minimize the window period for treatment and improve outcomes in ischemic stroke patients.

INTRODUCTION:

Stroke positions as the moment most common causes of passing universally and may be a major supporter to inability. One in six people will encounter a stroke in their lifetime. (1) A brain assault, now and then alluded to as a stroke, happens when blood supply route within the brain bursts or when something hinders the flow of blood to a particular area of the brain.(2) A confined blood stream to the brain or a sudden cerebral hemorrhage can both result in stroke. (3) Two categories of strokes exist. When the blood stream to the brain is blocked, one shape of stroke that happens is ischemic stroke. Both oxygen and supplements cannot be conveyed to the brain by means of the blood.(4) The blood cannot supply the brain with oxygen or supplements. Haemorrhagic stroke is characterized as brain hemorrhages that happen all of a sudden. The weight from the spilled blood harms the brain cells. Stroke can be caused by either an unexpected cerebral drain or blocked blood supply to the brain.(5)

One kind of stroke that happens when there's a blockage within the blood supply to the brain is called an ischemic stroke. A CT check is a crucial instrument within the treatment of stroke patients. In numerous places, especially in country, developing nations, CT checks are not promptly accessible.(6,7) One safe diagnostic option could be the Siriraj stroke score Method that can be utilized when CT checks are either in accessible or restrictively costly. Treatment for stroke to treat blood clots, clot dissolving medicines like tissue plasminogen activator(tPA) or Tenecteplase (TNK) work effectively for a huge number of patients.(8) A blood slenderer can be utilized to break down the clot or it can be physically evacuated inside the four and a half hours "golden window". (9)

Poungvarin created the Siriraj stroke score 1991 at the Siriraj healing centre in thailand.N.et al. clinical information and the Siriraj score framework can be utilized to distinguish between a drain and an infarction. But CT comes about have to be utilized to distinguish between a discharge and a localized necrosis. But CT comes about require to be utilized arrange to begin assist medications.(10,11)

Unique form of SSS = (0.8 x level of consciousness) + (0.66 x vomiting) + (0.66 x headache) + (0.03 X DBP)– (0.99 x atheroma markers) -3.71

Simplification of the SSS: (2.5 x consciousness) - (3 x atheroma markers) + (2 x vomiting) + (2 x headache) + (0.1 x DBP)-12.

Table 1: (Siriraj stroke score)

S.no	Variables	Clinical features		Score	Factor s
1.	Consciousness level	Alert	-	0	
					X 2.5
		Stupor, Drowsy	-	+1	
2.	Vomiting	No	-	0	
					X 2
		Yes	-	+1	
3.	Headache	No	-	0	
					X 2
		Yes	-	+1	
4.	DBP	mmHg	-	-	X0.1
5.	Atheroma markers (DM, angina, intermittent claudication)	None	-	0	
		One or more	-	1	X-3
	Relentless		-	-	-12

A score of less than one was considered an ischemic stroke.
A score of one to one was considered inconclusive

METHODS AND METHODOLGY:

The study was conducted at the Department of Emergency Medicine, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai. It was a prospective study carried out from February to May 2024, with a duration of three months. The sample size was calculated to be 85 patients with ischemic stroke. The sample size determination followed the formula Z2Pq/L2Z^2 Pq

/ L^2Z2Pq/L2, with the primary goal of estimating the sensitivity of a new diagnostic test. Based on literature analysis, the sensitivity for ischemic stroke was 83.87%, specificity was 66.66%, and the precision was within ±10%. The desired confidence level was 95%.

For ischemic stroke, the inclusion criteria included patients who presented to the emergency department with acute signs and symptoms of stroke, aged 20 years or older, and experiencing sudden neurological impairment within 14 days, without an apparent cause related to other neurological diseases or trauma. The exclusion criteria consisted of patients under 20 years of age, those with prior neurological conditions, space-occupying lesions, individuals on anticoagulant therapy, and those with stroke duration greater than 14 days, as this could affect the ability to accurately diagnose ischemic stroke using CT scans.

The research used a prospective design and a quantitative methodology. To select the 85 acute stroke patients, a selective sampling technique was employed. In accordance with inclusion criteria. Written, informed consent was provided by each patient and their family member to take part in the study. Within 24 hours after acute stroke signs and symptoms, the principal investigator with intern and nurses will complete a proforma, including patient demographics, hospitalization diagnosis, comorbidities, vital signs, capillary blood glucose, and GCS. The formula shown below is used to determine the Siriraj Stroke Score. Compare the CT-brain report after that. The data were assessed using descriptive and inferential statistics, such as correlation analysis, chi-square test, mean, frequency, percentage, and standard deviation. T–test, sensitivity & specificity, and Correlation Analysis.

RESULTS:
RESIDENCE AMONG THOSE AFFECTED BY ISCHEMIC STROKE
Patient from the Emergency Department of Sri Ramachandran Institute of Higher Education and research made up 86 study participants in total -21 from rural and 65 from metropolitan areas.

(Table No- 1)

Variables		Frequency	Percent
Residence	Rural	21	24.4
	Urban	65	75.6

The majority 76% of patients were urban and 24% of patients were rural included in our study.

ONSET OF SYMPTOMS TO HOSPITAL ADMISSION TIME IN THE GROUP AFFECTED BY ISCHEMIC STROKE
Overall, 86 people from the Sri Ramachandra Institute of Higher Education and Research's Emergency department participated in the ischemic stroke research.23 delays under 4 hours and 63 delays exceeding 4 hours.

(Table No -2)

Variables		Frequency	Percentage
Time	>4 hours	63	73.3
	< 4 hours	23	26.7

Among the patients in our study, 30.5% were >4 hours delayed. Whereas the remaining 69.5% were <4 hours delayed.

PRIMARY COMPLAINT IN THE GROUP WITH ISCHEMIC STROKE
The most common complaints among those who had an ischemic stroke include limb weakness, slurred speech, impaired responsiveness, headache, vomiting, giddiness, and mouth deviation. In our ischemic stroke group, limb weakness was the leading complaint in 45.2% of the patients.

KNOWN CASE OF DIABETES MELLITUS IN ISCHEMIC STROKE
Among the total 86 ischemic stroke populations, K/C/O DM were 51individual and not K/C/O DM were 35 individual.

(Table No: 3)

Variables		Frequency	Percentage
DM	No	35	40.7
	Yes	51	59.3

In the population with ischemic stroke in 40.7% of patients, DM is not known to exist. 59.3% of the patients had previous diabetes. The vast majority .f individuals have DM in the past.

Examination of ischemic stroke in individualspresenting atheroma indicators
Overall, there were 86 cases of ischemic stroke, of which 33 had positive atheroma markers.53 individuals who do not have atheroma markers.

(Table No: 4)

Variables		Frequency	Percentage
Atheroma markers	No	5	61.6
	Yes	33	38.4

In the population with ischemic stroke, 38.4% had atheroma markers present and 61.6% did not. In our investigation, the majorityof patients had no prior history of atheroma indicators.

THE ARRIVAL OF STROKE PATIENTS AT THE HOSPITAL DETERMINES THE DURATION OF THE CT SCAN FOR THE ISCHEMIC STROKE POPULATION.

When do stroke patients arrive at the hospital? For the group of suffering from ischemic stroke, the duration of the CT scan is <1 hour (14.9%), 1-2 hours (34.5%), 2 to 3 hours (24.1%), 3 to 4 hours (17.2%), and less than 4 hours (8%).

(TABLE NO: 5)

Variables		Frequency	Percent
CT time	<1	13	14.9
	1 to 2	30	34.5
	2 to 3	21	24.1
	3 to 4	15	17.2
	>4	7	8

The majority of CT reports are completed in 1 to 2 hours (34.5%) and 2 to 3 hours (24.1% in case of ischemic stroke patients after they arrive at the hospital

CT/MRI REPORTS IN THE POPULATION OF ISCHEMIC STROKES

Based on the diagnosis of acute infarct (31.39%), infarct (60.46%), lacunar infarct (8.13%), and small vessel ischemic alteration (6.97%), 86 ischemic stroke patients were reported.

Figure No: (6)
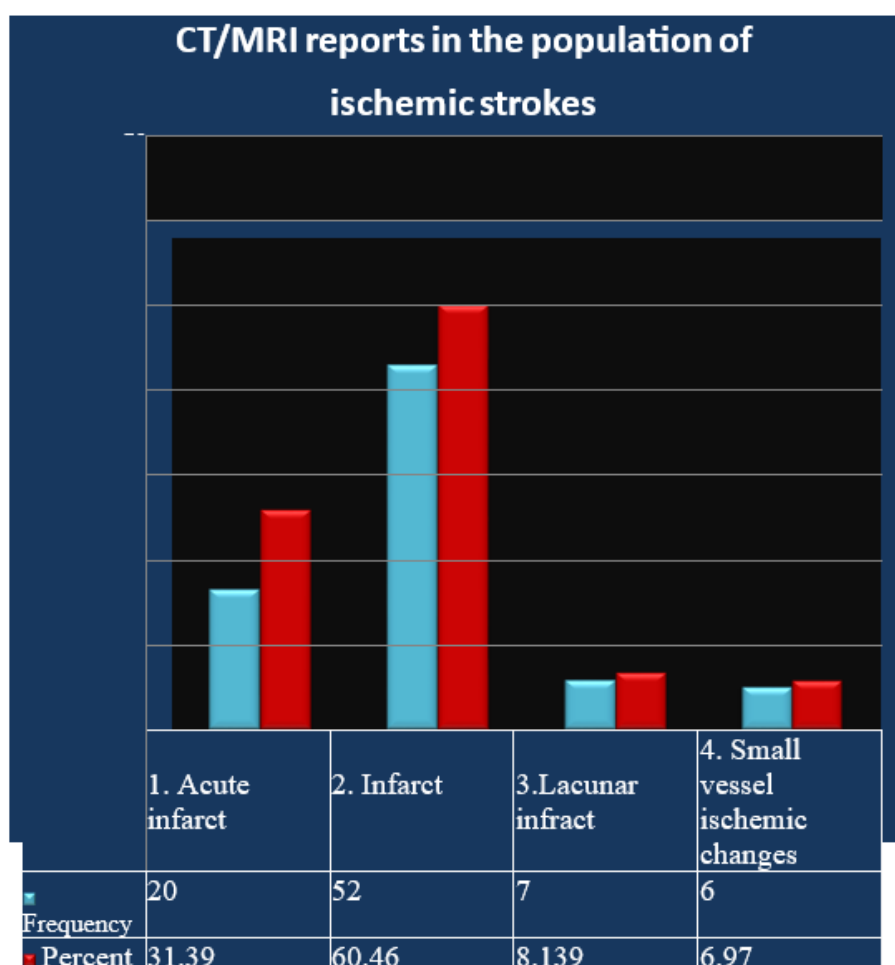
The Most common diagnosis in radiological reports was infarct (60.46%), followed by acute infarct is (31.39%), and lacunar infarct (8.1%) and small vessel ischemic changes 6.97% (least common).

The Siriraj stroke score's specificity and sensitivity. In the case of ischemic stroke patient.

(Table No: 7)

Siriraj stroke score- ischemic Stroke	CT- findings/MRI		X^2 - value	'p' value
	Yes	No		
Yes	74 (95.5%)	6(100%)	0.4838	0.487
No	6 (7.5%)	0(0%)		
Sensitivity	92.5%			
Specificity	0%			
PP value	92.5%			
NP value	0%			

The study's findings were that ischemic stroke had 92.5% sensitivity and 0% specificity. Negative predictive value is zero, and positive value is 92.5%.the p- value is 0.487.

AVERAGE COMPARISON WITH OTHER ISCHEMIC STROKE VARIABLES

(Table No: 8)

Mean comparison of gender with other variables (ischemic stroke)			
Variables		Mean+S.D	**p value**
Pulse rate	Male	85.43+17.4	**0.393**
	Female	90.96+20.5	
BP mm Hg(SBP)	Male	146.33+25.0	**0.028***
	Female	133.08+14.5	
BP mm Hg(DBP)	Male	87.83+14.5	**0.071**
	Female	81.15+17.7	
Respiratory rate Breaths/min	Male	21.08+2.4	**0.437**
	Female	20.69+1.5	
SPO2%	Male	98.07+1.9	**0.285**
	Female	97.69+2.1	
CBG mg/dl	Male	175.42+76.7	**0.521**
	Female	187.88+93.9	
Temperature	Male	98.53+0.9	**0.506**
	Female	98.39+0.7	
GCS	Male	14.20+1.7	**0.848**
	Female	14.27+1.7	
Age	Male	63.41+13.3	**0.393**
	Female	**60.69+13.8**	

DISCUSSION:

In this study, the Siriraj stroke score demonstrated a high sensitivity of 92.5% for ischemic stroke, meaning that it was effective in correctly identifying patients with ischemic strokes.(13) However, it had a specificity of 0%, indicating that the score was not reliable in ruling out ischemic strokes in patients who did not have the condition.(14) The positive predictive value of 92.5% suggests that when the Siriraj score is high, it is very likely that the patient is experiencing an ischemic stroke. This is consistent with findings from other studies, such as those by Sherin A et al. and Shah FU et al., which reported similar sensitivities for ischemic stroke detection, ranging from 63.74% to 94.73%. (15)

However, the low specificity observed in our study suggests that while the Siriraj score may be a useful screening tool for identifying ischemic strokes, it is not sufficient on its own to exclude the diagnosis. (16) In clinical practice, this highlights the need for confirmatory imaging, such as CT scans or MRIs, to accurately differentiate ischemic stroke from other conditions. The presence of common atheroma markers, such as hypertension, diabetes, and ischemic heart disease, in ischemic stroke patients further supports the utility of the Siriraj stroke score, as these risk factors were observed in a significant proportion of patients.(17,18) These findings underscore the importance of using the Siriraj score in conjunction with other diagnostic tools and clinical assessments to ensure accurate diagnosis and management of ischemic stroke.(19)

CONCLUSION:

The study emphasizes the Siriraj Stroke Score (SSS) as an effective predictive tool for ischemic stroke.(20) The SSS demonstrates high sensitivity (92.5%) and a positive predictive value of 92.5% for ischemic stroke, making it a reliable indicator for identifying patients with this condition. However, it shows 0% specificity and negative predictive value, meaning it cannot reliably exclude ischemic stroke in patients who do not have it. The study recommends that when a patient exhibits stroke symptoms, the Siriraj Stroke Score should be computed immediately. If the score is positive for ischemic stroke, emergency room staff should be notified without delay, and aggressive measures, including CT scanning and early treatment, should be initiated to minimize the window period for intervention and improve the chances of survival. Ultimately, the Siriraj Stroke Score is particularly valuable for diagnosing ischemic stroke and guiding immediate clinical action.

Ethical Considerations:

The study was approved by the Sri Ramachandra University (decision number: CSP – III/24/JAN/01/17).

Declaration of Interests:

The authors declare that they have no competing interest.

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